CLAIMS

What is claimed is:

1. A frequency synthesizer circuit, comprising:

a controllable oscillator configured to generate an output signal having a predefined frequency, the controllable oscillator having a plurality of operational states responsive to a plurality of control signals, each of the plurality of operational states defining a distinct frequency for the output signal of the controllable oscillator; and

a frequency control circuit in communication with the controllable oscillator, the frequency control circuit configured to determine the distinct frequency for the output signal that best approximates the predefined frequency and to provide the plurality of control signals, the plurality of control signals configured to change the controllable oscillator to the operational state corresponding to the distinct frequency that best approximates the predefined frequency.

2. The circuit of claim 1, wherein the frequency control circuit comprises:

a frequency detector configured to determine the frequency of the output signal;

a comparator configured to compare the frequency of the output signal to the predefined frequency; and

logic configured to determine which of the plurality of distinct frequencies for the output signal corresponding to the plurality of operational states best approximates the predefined frequency.

3. The circuit of claim 1, wherein the controllable oscillator comprises a plurality of parallel capacitors capable of being engaged by the plurality of control signals, the plurality of parallel capacitors defining the plurality of operational states of the controllable oscillator.

4. The circuit of claim 1, wherein the logic implements a binary search algorithm to determine which of the plurality of distinct frequencies for the output signal corresponding to the plurality of operational states best approximates the predefined frequency.

5. The circuit of claim 1, wherein the frequency control circuit comprises:

a program counter configured to generate a timing signal based on the predefined frequency, the timing signal having a plurality of clock pulses;

a frequency detector configured to receive the timing signal and, in response to each of the plurality of clock pulses, to generate a first digital word corresponding to the current frequency of the output signal of the oscillator;

a digital decoder configured to receive information, the information associated with the predefined frequency of the output signal of the oscillator, and to generate a second digital word corresponding to the predefined frequency;

a digital comparator configured to compare the first digital word to the second digital word; and

logic configured to receive the timing signal and, in response to each of the plurality of clock pulses, to generate the plurality of control signals based on the comparison of the first digital word to the second digital word.

6. A communication device for use in a communication system, comprising:

a transceiver configured to communicate with the communication system via a communication channel at a channel frequency; and

a frequency synthesizer configured to select the communication channel, the frequency synthesizer comprising:

a controllable oscillator configured to generate an output signal having a predefined frequency corresponding to the channel frequency, the controllable oscillator having a plurality of operational states responsive to a plurality of control signals, each of the plurality of operational states defining a distinct frequency for the output signal of the controllable oscillator; and

a frequency control circuit in communication with the controllable oscillator, the frequency control circuit configured to determine the distinct frequency for the output signal that best approximates the predefined frequency and to provide the plurality of control signals, the plurality of control signals configured to change the controllable oscillator to the operational state corresponding to the distinct frequency that best approximates the predefined frequency.

7. A method for controlling the frequency of an output signal of a controllable oscillator, the controllable oscillator having a plurality of operational states, each of the plurality of operational states defining a distinct frequency for the output signal of the controllable oscillator, the method comprising:

receiving information associated with a predefined frequency;

determining which of the plurality of distinct frequencies for the output signal of the controllable oscillator best approximates the predefined frequency; and

generating a control signal configured to change the controllable oscillator to the operational state corresponding to the distinct frequency that best approximates the predefined frequency.

8. The method of claim 7, wherein the determining which of the plurality of distinct frequencies for the output signal of the controllable oscillator best approximates the predefined frequency involves a binary search algorithm.

9. The method of claim 8, further comprising changing the controllable oscillator to the operational state corresponding to the distinct frequency that best approximates the predefined frequency.

10. The method of claim 9, wherein the changing the controllable oscillator to the operational state corresponding to the distinct frequency that best approximates the predefined frequency involves configuring a plurality of parallel capacitors in a predetermined manner.

11. A method for controlling the frequency of an output signal of a controllable oscillator, the controllable oscillator having a plurality of operational states, each of the plurality of operational states defining a distinct frequency for the output signal of the controllable oscillator, the method comprising:

receiving information associated with a predefined frequency;

determining a current frequency of the output signal of the controllable oscillator, the current frequency corresponding to a current operational state;

comparing the predefined frequency to the current frequency;

based on the comparing the predefined frequency to the current frequency, selecting one of two next operational states, the selected next operational state having a distinct frequency which better approximates the predefined frequency.

12. The method of claim 11, further comprising generating a control signal configured to change the controllable oscillator to the selected next operational state.

13. The method of claim 12, further comprising changing the controllable oscillator to the selected next operational state.

14. The method of claim 13, wherein the changing the controllable oscillator to the selected next operational state involves configuring a plurality of parallel capacitors in a predetermined manner.

15. The method of claim 13, further comprising repeating the determining the current frequency of the output signal of the controllable oscillator, the comparing the predefined frequency to the current frequency, the selecting one of two next operational states, the generating a control signal configured to change the controllable oscillator to the selected next operational state, and the changing the controllable oscillator to the selected next operational state.

16. A system for controlling the frequency of an output signal of a controllable oscillator, the controllable oscillator having a plurality of operational states, each of the plurality of operational states defining a distinct frequency for the output signal of the controllable oscillator, the system comprising:

means for receiving information associated with a predefined frequency;

means for determining which of the plurality of distinct frequencies for the output signal of the controllable oscillator best approximates the predefined frequency; and

means for generating a control signal configured to change the controllable oscillator to the operational state corresponding to the distinct frequency that best approximates the predefined frequency.

17. The system of claim 16, wherein the means for determining which of the plurality of distinct frequencies for the output signal of the controllable oscillator best approximates the predefined frequency involves a binary search algorithm.

18. The system of claim 17, further comprising means for changing the controllable oscillator to the operational state corresponding to the distinct frequency that best approximates the predefined frequency.

19. The system of claim 18, wherein the means for changing the controllable oscillator to the operational state corresponding to the distinct frequency that best approximates the predefined frequency comprises a plurality of parallel capacitors configured in a predetermined manner.

20. A system for controlling the frequency of an output signal of a controllable oscillator, the controllable oscillator having a plurality of operational states, each of the plurality of operational states defining a distinct frequency for the output signal of the controllable oscillator, the system comprising:

means for receiving information associated with a predefined frequency;

means for determining a current frequency of the output signal of the controllable oscillator, the current frequency corresponding to a current operational state;

means for comparing the predefined frequency to the current frequency;

means for selecting, based on the comparing the predefined frequency to the current frequency, one of two next operational states, the selected next operational state having a distinct frequency which better approximates the predefined frequency.

21. The system of claim 20, further comprising means for generating a control signal configured to change the controllable oscillator to the selected next operational state.

22. The system of claim 21, further comprising means for changing the controllable oscillator to the selected next operational state.

23. The system of claim 22, wherein the means for changing the controllable oscillator to the selected next operational state comprises a plurality of capacitors configured in a predetermined manner.

24. The system of claim 22, further configured to repeat the determining the current frequency of the output signal of the controllable oscillator, the comparing the predefined frequency to the current frequency, the selecting one of two next operational states, the generating a control signal configured to change the controllable oscillator to the selected next operational state, and the changing the controllable oscillator to the selected next operational state.

25. A computer readable medium for controlling the frequency of an output signal of a controllable oscillator, the controllable oscillator having a plurality of operational states, each of the plurality of operational states defining a distinct frequency for the output signal of the controllable oscillator, the computer readable medium comprising logic configured to receive information associated with a predefined frequency, to determine the distinct frequency for the output signal of the controllable oscillator that best approximates the predefined frequency, and to generate a control signal configured to change the controllable oscillator to the operational state corresponding to the distinct frequency that best approximates the predefined frequency.

26. The computer readable medium of claim 25, wherein the logic for determining the distinct frequency for the output signal of the controllable oscillator that best approximates the predefined frequency involves a binary search algorithm.

27. The computer readable medium of claim 26, wherein the logic is further configured to change the controllable oscillator to the operational state corresponding to the distinct frequency that best approximates the predefined frequency.

28. A computer readable medium for controlling the frequency of an output signal of a controllable oscillator, the controllable oscillator having a plurality of operational states, each of the plurality of operational states defining a distinct frequency for the output signal of the controllable oscillator, the computer readable medium comprising logic configured to receive information associated with a predefined frequency, to determine a current frequency of the output signal of the controllable oscillator, the current frequency corresponding to a current operational state, to compare the predefined frequency to the current frequency, and to select, based on the comparing the predefined frequency to the current frequency, one of two next operational states, the selected next operational state having a distinct frequency which better approximates the predefined frequency.

29. The computer readable medium of claim 28, wherein the logic is further configured to generate a control signal configured to change the controllable oscillator to the selected next operational state.

30. The computer readable medium of claim 29, wherein the logic is further configured to change the controllable oscillator to the selected next operational state.

31. The computer readable medium of claim 29, wherein the logic is further configured to repeat the determining the current frequency of the output signal of the controllable oscillator, the comparing the predefined frequency to the current frequency, the selecting one of two next operational states, the generating a control signal configured to change the controllable oscillator to the selected next operational state, and the changing the controllable oscillator to the selected next operational state.